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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,468	04/20/2006	Katsumi Yabusaki	287117US0PCT	7180

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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MAIER, LEIGH C

ART UNIT	PAPER NUMBER
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1623

NOTIFICATION DATE	DELIVERY MODE
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09/03/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/576,468	<b>Applicant(s)</b> YABUSAKI, KATSUMI	
	<b>Examiner</b> Leigh C. Maier	<b>Art Unit</b> 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-9,13,15,17 and 19-30 is/are pending in the application.
- 4a) Of the above claim(s) 23-28 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-9,13,15,17, 19-22 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 12, 2009 has been entered.

Claims 1, 9, 13, 15 and 17 have been amended. Claims 1, 3-9, 13, 15, 17 and 19-30 are pending. Claims 23-28 and 30 are withdrawn as being drawn to a non-elected invention. Any objection or rejection not expressly repeated has been withdrawn. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The declaration under 37 CFR 1.132 filed May 12, 2009 is insufficient to fully overcome the rejection of claims as set forth in the last Office action. The declaration will be discussed as it applies to rejections below.

### ***Claim Rejections - 35 USC § 112***

Claims 19-22 and 29 were previously rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

However, upon further consideration, it would appear that the claim is broad rather than indefinite. Essentially, any product that is not saturated would reasonably be considered dried.

Art Unit: 1623

The examiner does not agree that “dried” as currently stated in the claims requires a product subjected to the drying process described in the preparation of products A, B and C. This rejection is withdrawn.

Claims 19-22 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that Applicant, at the time the application was filed, had possession of the claimed invention.

The claims recite the limitation “dried” cellulose II. As discussed above, this limitation could be interpreted in a variety of ways. However, the only reference found by the examiner with respect to “dried” cellulose II is at page 21, paragraph [0030] of the specification, wherein the cellulose II product is prepared by a particular process and then dried at 70° for 6 hours to an unstated moisture content. The specification therefore provides support for a product prepared and dried in this manner but not the full scope embraced by the term “dried cellulose II.”

Applicant’s arguments filed May 12, 2009 have been fully considered but they are not persuasive.

Applicant argues that drying the cellulose II is described at paragraphs [0019], [0029], [0030] and [0037].

It is noted that [0019] is drawn to the description of drying the final derivatized product, not the newly prepared cellulose II, per se. The other cited passages simply describe the process (70° for 6 hours) discussed by examiner above.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 8, 9, 13, 15, 17, 19-22 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Pieschel et al (WO 99/28372\*) with Kroon-Batenburg et al (Glycoconj. J., 1997) to support inherency. \*Because this reference is not in English, the examiner is relying on US 6,579,977 to indicate its contents.

Pieschel discloses the preparation of a biosorbent product for removing heavy metals, comprising cellulose that is phosphorylated (5-10% phosphorus content) and carbamidated. See abstract; col 4, lines 26-28; and tables in col 12 and 13. The product is prepared by a process that requires the essential step of driving off the moisture in the reaction mixture before the actual phosphorylation and carbamidation. See col 4, beginning line 26 and continuing through col 5, line 15 and examples. The reference discloses the use of the product in an adsorber column. See col 2, lines 57-60.

The reference is silent with respect to the form of cellulose that is used in the production of the product. However, it is the product itself that determines patentability. Furthermore, it is known that the derivatization itself results in cellulose II structure, (See Kroon-Batenburg at 1<sup>st</sup> paragraph) so it would appear that regardless of the starting cellulose, the eventually prepared phosphorylated/carbamidated cellulose would have the cellulose II structure. It may be that the

Art Unit: 1623

two processes result in distinguishable, but the burden is on Applicant to demonstrate any difference(s).

***Claim Rejections - 35 USC § 103***

Claims 1, 3-9, 13, 15, 17, 19-22 and 29 are again rejected under 35 U.S.C. 103(a) as being unpatentable over de Pieschel et al (WO 99/28372) in view of Reineke et al (US 4,851,120).

Pieschel teaches as set forth above. The reference does not teach the biosorbent product in the particularly recited forms of claims 6 and 7.

Reineke teaches that anionic polysaccharides, particularly cellulose derivatives, such as cellulose phosphate, in the form of membranes (or “fabric”) have utility for the adsorption of metal ions. See col 2, lines 20-26 and col 3, lines 36-55. The reference further teaches that the membranes may be formed into any desirable shape such as convex, concave or tubular. See col 4, lines 48-55. The reference does not specifically teach the use of the product in the form bag or a cylinder or fabric inside a water storage tank. However, it is noted that a bag could be construed essentially as any non-flat membrane, as suggested by the reference.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the Pieschel biosorbent product in the forms taught by Reineke with a reasonable expectation of success. The artisan would be motivated to use this product in said forms because it is expressly suggested in the art. Pieschel specifically suggests water filtration, so the use in any water-containing vessel would be obvious.

Art Unit: 1623

Claims 1, 3-5, 9, 13, 15, 17, 19-22 and 29 are again rejected under 35 U.S.C. 103(a) as being unpatentable over de Magalhaes Padilha et al (Talanta, 1997) in view of Ford et al (US 2,482,755) and Zeronian et al (J. Appl. Polym. Sci., 1980) as set forth in the previous Office action.

de Magalhaes Padilha teaches the use of cellulose phosphate in chromatographic columns for the adsorption of metal ions from aqueous solutions. See abstract, for example. The reference cites the method of Ford in preparing the cellulose phosphate. (The Ford reference cited in this action appears to be the one cited in de Magalhaes Padilha, but the patent number is truncated.) The cited method treats a cellulose substrate with a phosphoric acid in the presence of urea. See examples. The method does not exemplify a cellulose II product. However, the reference expressly suggests the use of cellulose substrates previously subjected to other processing, such as mercerization. See col 9, lines 46-50.

Zeronian teaches as set forth above. The reference further teaches that mercerization prior to phosphorylation has the beneficial effect of making the cellulose more receptive to the phosphorylating reagents and resulting in a more uniformly phosphorylated product. See page 522, lines 1-3 and paragraph bridging pages 527 and 528.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the metal-adsorbing system of de Magalhaes Padilha by modifying the method of preparing the cellulose phosphate used in said system. The artisan would be motivated to pretreat the cellulose starting material by mercerizing it as suggested by Zeronian in order to make the cellulose more receptive to the phosphorylating reagents and a more uniformly phosphorylated product. One of ordinary skill would reasonably expect success

Art Unit: 1623

in making this modification. It would be further within the scope of the artisan to optimize the degree of phosphorylation for metal adsorption through routine experimentation. In carrying out the procedure in the presence of urea, the product would be carbamidated.

Claims 19-22 and 29 are recited as product-by-process claims. However, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In the instant case, Dr. Yabusaki's declaration demonstrates that the cellulose product prepared by a particular method set forth in the specification demonstrates greater metal adsorbing capacity. However, these data are not commensurate with the scope of the claims. The results appear to depend on a particular process of making the product—the particular mercerization and drying protocol described in the specification and discussed above.

Applicant's arguments filed May 12, 2009, have been fully considered but they are not persuasive.

Applicant argues that Zeronian teaches away from the use of dried mercerized cellulose. However, most of the claims do not recite the product-by-process limitation requiring the use of dried material. Furthermore, the product is not limited by its method of making unless it is shown that that method confers some distinguishing feature upon it. The declaration discussed above demonstrates such a feature, but it is only for a particular sub-set of the "dried" celluloses embraced by the claims.



Applicant further states that “it would not necessarily be expected that Ford et al’s product is carbamidated cellulose phosphate.” However, no evidence is presented to support this hypothesis.

Applicant further discusses the unexpected results set forth in the Yabusaki declaration. This is addressed above. There do appear to be unexpected results, but they are not commensurate with the scope of the claims.

Claims 1, 3,4, 6, 7, 9, 13, 15, 19-22 and 29 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Reineke et al (US 4,851,120) in view of Zeronian et al (J. Appl. Polym. Sci., 1980) as set forth in the previous Office action.

Reineke teaches that anionic polysaccharides, particularly cellulose derivatives, such as cellulose phosphate, in the form of membranes (or “fabric”) have utility for the adsorption of metal ions. See col 2, lines 20-26 and col 3, lines 36-55. The reference suggests the preparation of cellulose phosphate by reacting cellulose with phosphoric acid and urea. See col 3, lines 13-17. The reference further teaches that the membranes may be formed into any desirable shape such as convex, concave or tubular. See col 4, lines 48-55. The reference does not teach the use of a cellulose II phosphate.

Zeronian teaches as set forth above.

It would have been obvious to one having ordinary skill in the art at the time the invention to prepare metal-adsorbing membrane comprising cellulose phosphate by preparing said cellulose phosphate by reacting cellulose with phosphoric acid and urea, as suggested, with the modification of mercerization pretreatment taught by Zeronian. The artisan would be

Art Unit: 1623

motivated to make said modification in order to make the cellulose more receptive to the phosphorylating reagents and a more uniformly phosphorylated product. One of ordinary skill would reasonably expect success in making this modification. It would be further within the scope of the artisan to optimize the degree of phosphorylation for metal adsorption through routine experimentation. With respect to claims 6 and 7, the references do not specifically teach the use of the product in the form bag or a cylinder or fabric inside a water storage tank. However, it is noted that a bag could be construed essentially as any non-flat membrane, as suggested by the reference. The reference expressly suggests the treatment of water, so it would be obvious to one of ordinary skill to use the product in an appropriate form in any apparatus where water is processed or stored. In carrying out the procedure in the presence of urea, the product would be carbamidated.

Claims 19-22 and 29 are recited as product-by-process claims. However, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. The Yabusaki declaration applies to the “dried” limitation as above.

Applicant’s arguments filed May 12, 2009, have been fully considered but they are not persuasive.

Applicant’s only argument appears to be limited to the superior properties set forth in the Yabusaki declaration. This is addressed above. The results are not commensurate with the scope of the claims.

Claims 1, 2, 4, 8, 9, 13, 15 and 17 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Bernadin (US 3,691,154) in view of Zeronian et al (J. Appl. Polym. Sci., 1980). Newly added claims 19-22 and 29 are included in this rejection.

Bernadin teaches the preparation of cellulose phosphate using the urea phosphate method, followed by the conversion to an alkali metal salt. See col 2, lines 15-64. The reference does not teach a cellulose II phosphate.

Zeronian teaches as set forth above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to prepare the cellulose phosphate by preparing said cellulose phosphate product by the urea phosphate method, as suggested, with the modification of mercerization pretreatment taught by Zeronian. The artisan would be motivated to make said modification in order to make the cellulose more receptive to the phosphorylating reagents and a more uniformly phosphorylated product. One of ordinary skill would reasonably expect success in making this modification. It would be further within the scope of the artisan to optimize the degree of phosphorylation for metal adsorption through routine experimentation. In carrying out the procedure in the presence of urea, the product would be carbamidated.

Claims 19-22 and 29 are recited as product-by-process claims. However, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In the instant case, there is no evidence that preparing the product with

Art Unit: 1623

dried cellulose II confers some property that makes said product distinguishable from one prepared in another manner.

Applicant's arguments filed May 12, 2009, have been fully considered but they are not persuasive.

Applicant's only argument appears to be limited to the superior properties set forth in the Yabusaki declaration. This is addressed above. The results are not commensurate with the scope of the claims.

*Examiner's hours, phone & fax numbers*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh Maier whose telephone number is (571) 272-0656. The examiner can normally be reached on Tuesday, Wednesday, and Friday 7:00 to 3:30 (ET).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Anna Jiang (571) 272-0627, may be contacted. The fax number for Group 1600, Art Unit 1623 is (571) 273-8300.

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/Leigh C. Maier/  
Primary Examiner  
Art Unit 1623